DOCUMENT RESUME

ED 417 018 PS 026 326

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TITLE Collaboration from a Vygotskian Perspective.
PUB DATE 1997-04-00
NOTE 12p.; Paper presented at the Biennial Meeting of the Society for Research in Child Development (62nd, Washington, DC, April 3-6, 1997).
PUB TYPE Information Analyses (070) -- Opinion Papers (120) -- Speeches/Meeting Papers (150)
EDRS PRICE MF01/PC01 Plus Postage.
DESCRIPTORS *Children; Cognitive Development; *Cooperation; Cultural Influences; Individual Differences; *Problem Solving; Research Methodology; Research Problems
IDENTIFIERS Dyads; Historical Influences; Social Constructivism; Unit of Analysis Problems; Vygotsky (Lev S); Zone of Proximal Development

ABSTRACT

Lev Vygotsky maintained that historical and cultural aspects of development started from the point at which humans could first be distinguished from apes. It is critical to consider the dialectical relationship between the individual and the cultural environment in which the child actively masters cultural behavior. Interaction with others provides the means by which children adapt to the environment. The essential feature of learning is that it creates the zone of proximal development. Studies of collaboration should consider the three interrelated aspects of development: (1) individual, including age, gender, and temperament; (2) interpersonal, especially the dyad's past history and nature of the relationship; and (3) cultural-historical, the context in which a child masters methods of reasoning and problem solving. Studies of collaboration focusing solely on the interpersonal level cannot be said to be based on Vygotsky's theory. Also, studies should deal with the collaborative processes themselves rather than focusing on their effects. Conceptual problems are raised by comparing the work of a dyad asked to solve a problem to that of the individual. The individual is assumed to be working alone despite the fact that the experimenter is present and the dyad may not be actively working together to solve the problem, the critical characteristic of collaboration. Treating the dyad as the unit of analysis is more difficult statistically than focusing on one member of the pair, but is critical to the effective study of collaboration. (Contains 20 references.) (KB)

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Collaboration from a Vygotskian perspective

Paper presented in M. Gauvain & H. H. Ratner (Eds.),
"Social and cognitive constructions during collaboration: How are actions appropriated?"
symposium at the biennial meetings of the Society for Research in Child Development.
Washington, DC, April 1997

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Introduction

Vygotsky's cultural-historical theory views human development as a sociogenetic process by which children gain mastery over cultural tools and signs in the course of interacting with others in their environments. These others are often more competent, and help children to understand and use in appropriate ways the tools and signs that are important in the cultural group into which the children have been born. This process of interaction between the child and a more competent other is said to effect development if the interaction occurs within the child's zone of proximal development.

Although this summary is true to Vygotsky's position, we need to go further, and discuss several interrelated issues if we are to make progress in our understanding of collaboration from a Vygotskian perspective. The first has to do with uses of Vygotsky's theory itself, the second is conceptual (how we conceive of collaboration), and the third is both methodological and analytical.

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At the theoretical level, the problem has to do with conflating Vygotskian theory with one small part of the theory. When scholars study collaboration from a Vygotskian framework the most commonly cited concept is that of the zone of proximal development, although this concept is hardly the theory's cornerstone. To apply Vygotsky's theory to collaborative problem-solving (as to anything else) requires more than pairing a child with a more competent other and focusing simply on the interactions between them (or, for that matter, on the results of those interactions). Rather, it requires an interweaving of different aspects of development, involving the individual and the cultural-historical as well as the interpersonal, and focusing on the processes of development themselves.

For the purposes of this discussion each of these aspects of development (cultural-historical, individual, and interpersonal) will be treated as separate things. This is purely a heuristic device, for of course they do not operate separately, and Vygotskian theory requires understanding of their interrelatedness. We cannot understand the interpersonal processes that go on between people (whether child-child or adult-child dyads) without knowing something about the individual characteristics (such as age, gender, motivation, competence) that each participant brings to the relationship. At the same time, we cannot understand the interactions between these individuals without knowing something about the broader context which provides much of the meaning. This context is both microsystemic (is this collaboration taking place in school or home?) and macrosystemic (the culturally and historically derived meanings and status of collaborations between children, of what and how is considered appropriate behavior in the home or in the school, and so on). The systemic nature of Vygotsky's theory, as is true of Bronfenbrenner's ecological systems theory (Bronfenbrenner, 1989, 1993; Bronfenbrenner & Ceci, 1994; Tudge, Gray, & Hogan, 1996), should force researchers to analyze the interweaving of these aspects of development.

Aspects of development

Culture, history, and phylogeny. Much of Vygotsky's writing was concerned with evolution, in particular focusing on what distinguished humans from other animals, and especially from those closest to humans. Drawing on Darwin, Kohler, Koffka and others, Vygotsky and Luria (1993, 1994) argued that tool use in apes and chimps constituted the evolutionary link between the animal world and humankind. However, "in spite of the fact that the ape displays an ability to invent and use tools--the prerequisite for all human cultural development--the activity of labor, founded on this ability, has still not even minimally developed in the ape" (Vygotsky & Luria, 1993, p. 74). The use of tools in labor and, yet more important, the use of psychological tools, was critical in the development of human culture.

Tools, as used by humans, are so important because they stand as mediating devices between humans and their environments. Just as environments influence people's development, people actively change their environments. This is true whether one designs a stick to be used later for digging and planting (a physical tool) or uses a knot tied in a rope or gives another person a lynx's claw as a aid to memory (examples of psychological tools cited by Vygotsky & Luria, 1993, pp. 102-108). Of all psychological tools, the most powerful are signs and symbols, including language.

Vygotsky believed that historical and cultural aspects of development started from the point at which humans, in terms of phylogenetic development, could first be distinguished from apes. Culture is critical for subsequent development. Vygotsky argued, because culture

> creates special forms of behavior, changes the functioning of mind, constructs new levels in the developing system of human behavior....In the process of historical development, a social being changes the means and methods of his behavior, transforms natural inclinations and functions, develops and creates new, specifically cultural, forms of behavior (pp. 29-30).

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The nature and form of historical developments, in any culture, necessarily have an impact on the thinking, literacy, numeracy, art, and so on, that develops in that culture. These developments, in turn, have a profound effect on the ways in which children's development proceeds in different cultural groups. Study of any aspect of children's development, peer collaboration included, cannot ignore the cultural and historical context within which that development occurs. As Vygotsky argued in the first sentence of his 1929 paper "The problem of the cultural development of the child:" "In the process of development the child not only masters the items of cultural experience but the habits and forms of cultural behavior, the cultural methods of reasoning" (1994a, p. 57).

Individual aspects. However, it is also critical to bear in mind the dialectical relationship between the child and the cultural environment, for although the environment supplies the "habits and forms of cultural behavior" the individual is actively involved in "mastering" those habits and forms (Vygotsky, 1994a), and acquiring "as [his or her] personal property, that which originally represented on a form of [his or her] external interaction with the environment" (Vygotsky, 1994b). The ways in which this process took place was one of Vygotsky's main areas of interest, including the study of children who were deaf or blind. In his discussion of early development, Vygotsky argued that biological and maturational aspects of development (the "natural line") as well as aspects of the physical, social, and cultural environment (the "cultural line") had to be considered to make sense of development. Vygotsky believed that the two lines "coincide and merge one into the other. Both series of changes converge, mutually penetrating each other to form, in essence, a single series of formative socio-biological influences on the personality" (1983, p. 22).

This set of mutually interpenetrating influences cannot, of course, be separated into specific cultural and natural lines. Nonetheless, any interacting individuals bring to the interaction their own uniqueness, including such things as their gender, developmental status

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(prematurity or full-term birth, pubertal timing, etc.), physical or mental attributes, temperament, age, as well as what each individual brings in terms of personal history up to the point at which his or her development is being considered. These characteristics are socially rooted, of course, but at the same time are unique to each individual—their own "personal property" (Vygotsky, 1994b). They will be expressed in different ways by the specifics of the task and of the interacting partner, but any discussion of peer collaboration cannot ignore what each individual brings to the collaborative process.

By way of illustration of what Vygotsky meant by individual differences over time, he described four stages that children pass through in the course of memory development and the understanding of arithmetic (Vygotsky, 1994). In both cases, what was critical was the development in the child of the use of mediational means, in particular pictures and speech. Initially, in the early preschool years, Vygotsky argued that children rely on their natural or "primitive" behavior to try to remember some items. In the second stage, they can use the mediational means (for example, some type of representation of the items), but only if there is a clear connection between the item and the representation. If the link is not obvious, the children are as likely to remember something that was in the representation but had nothing to do with the item to be remembered. The third stage is one in which children start to use the mediating devices more actively, inventing linkages between the item and the representation even when there is no obvious connection. The final stage in the process is one in which the entire process becomes internal, and external mediational means are no longer required.

Vygotsky clearly stressed the individual's active role in development. Moreover, although he believed that collaboration with others was important, he made clear that its effectiveness has limits, limits that are set by the current developmental state of the individual:

> We said that in collaboration the child can always do more than he can do independently. We must add the stipulation that he cannot do infinitely more. What collaboration

contributes to the child's performance is restricted to limits which are determined by the state of his development and his intellectual potential (Vygotsky, 1987, p. 209).

Interpersonal aspects. The third interrelated aspect of development deals with interactions with others, something which occurs from the moment of birth. As Vygotsky and Luria argued, the "entire history of the child's psychological development shows us that, from the very first days of development, its adaptation to the environment is achieved by social means, through the people surrounding him. The road from object to child and from child to object lies through another person" (Vygotsky & Luria, 1994, p. 116). Vygotsky's best-known concept, the zone of proximal development, is most relevant in relation to this aspect of development. Contrasting traditional (and, indeed, contemporary even today) measures of intellectual development (the "actual" level, as determined by tests of what the child can currently do independently) with the proximal level (what the child can do with assistance of someone more competent, whether adult or child), Vygotsky argued that "the zone of proximal development has more significance for the dynamics of intellectual development and for the success of instruction than does the actual level of development" (1987, p. 209). Instruction, therefore, "is only useful when it moves ahead of development. When it does, it impels or wakens a whole series of functions that are in a stage of maturation lying in the zone of proximal development" (1987, p. 212). The zone is not, therefore, some clear-cut space that exists independently of the process of joint activity itself. Rather, it is created in the course of collaboration:

> We propose that an essential feature of learning is that it creates the zone of proximal development; that is, learning awakens a variety of developmental processes that are able to operate only when the child is interacting with people in his environment and in collaboration with his peers (Vygotsky, 1978, p. 90).

The specific mechanisms that allow the child to construct higher psychological structures, according to Vygotsky, are internalization and externalization. Children internalize or

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interiorize the processes occurring in the course of the interaction with the more competent member of the culture--they "grow into the intellectual life of those around them" (Vygotsky, 1978, p. 88). Internalization is not a matter of mere copying, however, since this would preclude the emergence of novelty. Rather, children transform the internalized interaction on the basis of their own characteristics, experiences, and existing knowledge. Development is thus a process of reorganization of mental structures in relation to one another (Vygotsky, 1994a). In subsequent interactions with the social world, the transformed knowledge/structures contribute to its reconstruction.

Collaboration in Vygotskian Perspective

To move beyond the purely theoretical discussion, we would like to focus on the implications for those of us who study collaborative problem-solving from a Vygotskian perspective. Given what has been written above, a study of collaboration between two people would involved consideration of the three interrelated aspects of development. At the individual level it is important to know what each person brings to the interaction. Relevant factors include age, gender, temperament, past experience and degree of competence with the problem on which they are collaborating, motivation and goals, and so on. At the interpersonal level, it is important to consider the dyad's past history together and the nature of their relationship, including socio-emotional factors (whether the pair are friends, acquaintances, or simply paired for the purposes of research, whether their past problem-solving relationship has been relatively cooperative or competitive, the dyad's relative status, etc.) and cognitive factors (such as the dyad's relative competence and perception of relative competence). At the cultural-historical level, it is important to understand the extent to which cultural and institutional supports have developed for the type of problem on which the dyad is collaborating, for collaboration between individuals of the type being studied, and for collaboration at all. Some cultures (and cultural groups within particular societies) are more encouraging of cooperation than others; some cultures consider

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collaboration between individuals of different genders or between people of different statuses as more appropriate than do others.

Studies of collaboration that focus solely on the interpersonal level, while often informative, cannot be said to be based on Vygotsky's theory, any more than can studies that try to explain development solely on the basis of the activities of individuals or studies that treat culture as the primary explanatory independent variable. Vygotsky's theory is systemic and treats these levels of analysis as interdependent and co-constitutive.

Moreover, studies of collaboration must deal with the collaborative processes themselves if they are to be set within a Vygotskian framework. As Vygotsky (1978) wrote, "the zone of proximal development defines those functions that have not yet matured but are in the process of maturation" (p. 86), and the reason for studying collaboration is that "learning awakens a variety of developmental processes that are able to operate only when the child is interacting with people in his environment and in collaboration with his peers" (p. 90). Studying the effects of collaboration, such as the extent to which one or both of the collaborating partners learn to solve the problem more easily is thus not as useful as studying the processes that led to those effects.

At the conceptual level, a problem is that "collaboration" is usually, albeit implicitly, defined as what one gets when children are paired or grouped and asked to work on a problem. The typical contrast is with singletons who work alone. However, for the interaction to be considered one of collaboration both partners should actively be working together to solve the problem. Alternatives include one working and the other waiting until the first has solved it, neither partner engaging with each other or with the problem, the pair enthusiastically cooperating, but on something other than the problem, etc. There is a similar conceptual problem raised by the treatment of individuals, who are somehow assumed to be working alone, despite the fact that the experimenter is present, either asking the questions or, at least as

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important, "invisibly" by virtue of having set up the experiment in a particular fashion and situated it in some specific context, typically a laboratory or school.

The final issue relates to methodological and analytical concerns. Much of the research on collaboration set within a Vygotskian framework focuses on the outcome for only one member of the pair. The reason is partly theoretical, partly statistical. If one's interest is in the effects of a child being paired with another child who is more competent, it makes sense to use as the outcome measure the performance of the former, ignoring the performance of the latter. This approach satisfies statistical requirements of independence of the unit of analysis, but means that we are no longer studying the collaborative pair, but only one member from each pair. Treating the dyad as the unit of analysis is a much more difficult statistical proposition, but nonetheless is critical if we are to study collaboration effectively.

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